

Expandable/Foldable Structures for Habitat, Phase I

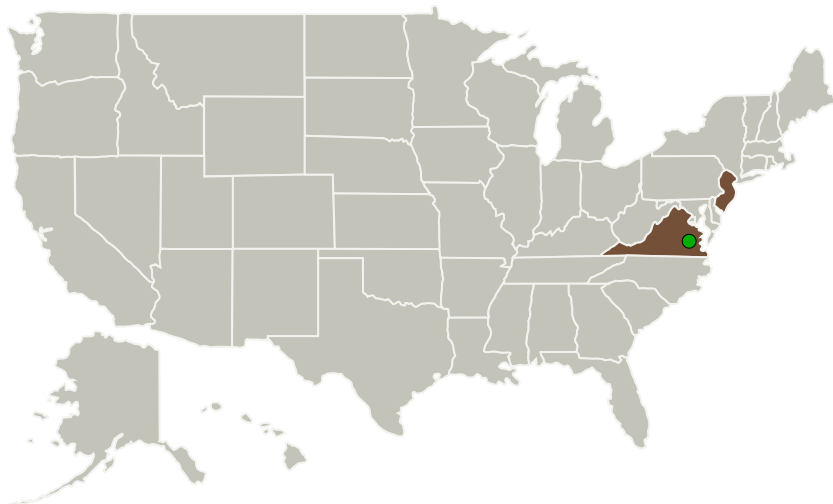
Completed Technology Project (2010 - 2010)



Project Introduction

Folded Structures Company (FSC) proposes the development of an innovative design approach for multi-laminate, primary and secondary structures for planetary habitats that integrates the dynamic deployment means with the static structural design using an advanced mathematical folding theory. The proposed approach holds the promise of a much simpler structure design that is both lightweight and compactable (low delivery volume) and yet capable of expanding into an expansive surface volume. FSC research indicates the possibility of a new class of deployable, space-based structures that utilize an advanced folding methodology as the primary engineering and assembly method combined with the use of multi-laminate sheet materials. The proprietary patterning algorithms design tessellations for planar sheets that articulate dynamically on the edges of the tessellation allowing for uniform deployment across the entire sheet. Previous to the development of these algorithms, there was no general system for generating doubly periodic folded structures. Based on results from a previous NASA SBIR project, FSC will apply its proprietary folding techniques to the broad topic of expandable habitat structures. The proposed project will essentially become the demonstration stage for the previous research effort, and thus, extend and provide continuity to the ongoing NASA interest in this area.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Folded Structures Company, LLC	Lead Organization	Industry	Ringoes, New Jersey
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
New Jersey	Virginia

Project Transitions

**January 2010:** Project Start**July 2010:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/140094>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Folded Structures Company, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Daniel Kling

Co-Investigator:

Daniel Kling

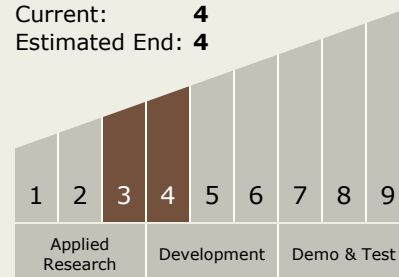
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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.5 Innovative, Multifunctional Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System